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AĞIZ, ÇENE VE
DİŞ CERAHİSİ
ALANINDA ARAŞTIRMALAR
VE DEĞERLENDİRMELER

EDİTÖR

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**Ağız, Çene ve Diş
Cerrahisi Alanında
Araştırmalar ve
Değerlendirmeler**

Ekim 2024

Editör:
Doç. Dr. Ümit YOLCU

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BÖLÜM 1

IS BICHECTOMY A PREFERABLE AND RELIABLE OPERATION FOR ESTHETIC REASONS?

Sinan Yasin ERTEM¹

Hüseyin Tutku BEKAR²

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Introduction

Bichectomy, a cosmetic procedure that aims to reduce facial fullness by removing the buccal fat pads, has become a highly sought-after operation in recent years. This procedure, which was initially limited to the field of plastic and reconstructive surgery, is now increasingly attracting the attention of surgical specialties in various fields. But is bichectomy an appropriate and preferable operation for surgeons?

This book chapter discusses the anatomy of bichat adipose tissue, describes the techniques and complications of bichectomy, and evaluates whether it should be considered a standard procedure in the surgical field from a clinical, ethical and professional perspective.

Bichat adipose tissue is a fatty body in the cheeks, first described by the German Laurentius Heister and recognized as a gland. It was analyzed by Frenchman Marie François Xavier Bichat in 1802 and found to be adipose tissue. This body is associated with the masticatory muscles and is located between the muscles like a cushion. (1)

Bichectomy is the excision of this cheek fat pad which is located between the masseter and buccinator muscle. Bichectomy surgery is a cosmetic and functional surgery performed in dental practice to improve facial aesthetics and sometimes chewing function. The extent of tissue removed, however, varies among patients. The amount of Bichat fatty tissue removed in most cases is very small, but in patients with oval or rounder faces, a much larger amount of tissue can be removed. Large fat pads can force the inner face of the cheek in occlusion, causing intra-cheek pitting, ulcerations on the mucosa called ‘morsicatio buccarum’, hyperkeratotic areas and recurrent lesions leading to hemorrhage. (2)

The surgery is stated for normally active patients without severe medical problems seeking a more pronounced facial shape and improvement of the discomfort associated with repetitive trauma to the inner cheeks. This surgical procedure has contraindications and risks and should be carefully evaluated before the procedure. Analysing the indications for bichectomy and distinguishing it from having a strictly aesthetic, functional, or aesthetic-functional purpose is also important. It is also important to talk with the patients about their prospects without guaranteeing or promising unrealistic results.

2. Anatomy of the Buccal Fat Pad

The buccal fat pad is a distinct anatomical structure containing encapsulated adipose tissue located between the buccinator muscle and the masseter muscle. The Bichat tissue, which extends from the temporal to

the mandibular region, contributes to the roundness of the cheeks and acts both as a slippery pad that facilitates functional muscle movements during chewing and speaking, and as a cushion to protect neurovascular structures. (3) Understanding this dual role is very important for oral, dental and maxillofacial surgeons, because removal of the buccal fat pad not only changes facial aesthetics, but may also affect functional aspects, especially in young patients (4).

The buccal fat pad comprises 3 different lobes: anterior, intermediate and posterior lobes. The posterior lobe has four extensions associated with the neighboring muscles:

- Buccal,
- Pterygoid,
- Pterygopalatine
- Temporal appendages

The buccal extension extends superficially within the cheek and the pterygoid and temporal extensions are located deeper. This unique location and structure make the buccal fat pad important for both facial aesthetics and oral function (1,2).

The main trunk of the fat pad is positioned over the parotid duct and lies above the anterior margin of the masseter. Afterward, it moves towards the medial aspect and rests on the posterior maxillary periosteum. At this site the fat pad body overlaps the top fibres above the buccinator muscle and runs along the vestibule over the second molar of the maxilla. At the posterior, it encircles the maxilla and runs along the pterygomaxillary fissure, where it comes into close connection with the branches of the maxillary division of the trigeminal nerve and the internal maxillary artery.

Buccal process is the most superficial part of the fat pads and gives roundness to the buccal cheek. The buccal appendage enters the cheek under the parotid duct and runs across the front border of the masseter as it moves down to the mandibular retromolar region. As it passes through the cheek, it overlaps the main part of the buccinator muscle. It extends superficially to the parotid duct fat pad and then pierces through the fat pad and the buccinator muscle and penetrates into the oral cavity facing the maxillary second molar. (3)

The buccal pad is innervated by the buccal and zygomatic branches of the facial nerve. The superficial temporal artery is supplied by the buccal branch of the maxillary artery and the facial artery and is surrounded by a thin fibrous capsule. (5)

The primary function of the buccal fat pad is to fill the masticatory cavity. It acts as a sliding cushion between the masticatory muscles, reducing friction, increasing their efficiency and filling the space between the mimetic muscles. Protecting the sensitive facial muscles from injuries caused by muscle movements or external trauma.

For these reasons, the decision to remove the buccal fat pad must be made correctly. Because this tissue is not only aesthetically important. It also has important functions. Like every operation, bichectomy has various indications. These indications will be mentioned below. However, when deciding on the operation, ethical considerations should be taken into account primarily to provide aesthetic gain while correcting the function at the same time.

In neonates (intermediate lobe) it counteracts negative pressure during aspiration (sucking) and modulates exocranial and endocranial pterygoid plexus venous blood flow, similar to a valve structure.

3. Overview of Bichectomy Operation

Like any surgical procedure, this operation has its indications:

- Closure of the oroantral relationship
- Use as a free graft in surgical procedures to be performed in the oral region
- Surface coating of bone grafts used for maxilla reconstruction
- For oral defects after excision of malignant lesions or neoplasms
- To repair congenital oral defects
- Repetitive trauma due to biting
- Reconstruction of cleft lip and palate
- Volume reduction in the cheek area for aesthetic/functional reasons

The bichectomy procedure is relatively simple and is usually performed under local anesthesia. The fact that the operation has both aesthetic and functional gains makes this technique attractive for surgeons. It can be used as an easily available tissue graft option that can be used for various operations in oral and maxillofacial surgery and for complications that develop during operations. Although this operation is easy to perform, there is no single gold standard method. When the literature is reviewed, physicians excise buccal bichat adipose tissue with different surgical approaches. The important thing here is to excise the buccal fat pad with the

most minimally invasive method without damaging the adjacent anatomical structures. Particular attention should be paid not to damage the stenson canal and facial nerve. We have included 3 techniques that we could find in the literature in this book chapter.

a. Technique- 1

- Local anesthesia is used intraorally to block the buccal nerve and posterosuperior alveolar nerve on the inner surface inside the buccal cheek in the vicinity of the parotid excretory duct. Bleeding can also be reduced by using adrenaline anesthesia.
- The incision site is on the vestibular fundus, at the distal border of the second molar, 30 mm away vestibule and superior to the parotid duct.
- The incision is initially performed by piercing the alveolar mucosa, the buccinator muscle and the capsule of connective tissue surrounding the Bichat buccal fat pad. The incision is then prolonged approximately 1.5 cm till it extends to the mesial cavity of the first molar.
- A curved hemostat is used to expand the tissues.
- As needed, the buccal fat pad is completely removed bilaterally in a symmetrical manner with careful circular movements to avoid damaging the vascular pedicle.
- If there is no facial asymmetry, the buccal fat pad tissue removed bilaterally should be excised evenly. Generally, the preferred method is to place the excised tissue in a syringe and measure its volume.
- After the tissue is excised, the wound site is irrigated with 0.9% saline and the incision site is sutured with 4.0 silk suture and a tampon is applied.
- This removal of the buccal fat pad is performed after exposure of the parotid papilla to avoid damage to Stensen's canal.

b. Technique- 2

- Local anesthesia is used intraorally to block the posterosuperior alveolar nerve and buccal nerve on the inner surface of the cheek around the parotid excretory duct. Bleeding can also be reduced by using adrenaline anesthesia.

- After local anesthesia, the patient's mouth is opened maximally.
- The incision site is located 1 cm posterior to the parotid excretory duct and at the level of the second upper molar on the occlusal side.
- A 1 cm long vertical incision is made until the buccal fat pad is observed.
- The fat is mobilized with Kelly forceps and the blunt tool is advanced into the temporal and posterior region until movable adipose tissue is achieved.
- The vascular pedicle should not be damaged.
- As needed, the buccal fat pad is completely removed bilaterally in a symmetrical manner with careful circular movements to avoid damaging the vascular pedicle.
- If there is no facial asymmetry, the buccal fat pad tissue removed bilaterally should be excised evenly. Generally, the preferred method is to place the excised tissue in a syringe and measure its volume.
- After the fat is removed, the wound site is irrigated with 0.9% saline, sutured and local compression with gauze is recommended.
- There is a risk that the vertical incision used in this technique may increase the possibility of injury to anatomically important tissues.

c. Technique- 3

- Local anesthesia is used intraorally to block the posterosuperior alveolar nerve and buccal nerve on the inner surface of the cheek around the parotid excretory duct. Bleeding can also be reduced by using adrenaline anesthesia.
- The incision in the cheek area can be made slightly below the parotid canal, following the horizontal chewing line, approximately 1.5 cm in length, or just below the lower part of the vestibule, between the first and second molars, a distance of 2 cm in a horizontal direction.
- The depth of the incision should be superficial enough for a blunt-tipped instrument to separate the buccinator muscle fibers and capture the fat pad.
- Access through a lower incision in the jugal mucosa, combined with gentle digital compression of the cheek from the outside, al-

most naturally exposing the fat pad to the mouth, is a very safe technique that avoids nerve, vascular and ductal injuries.

- Surgical incisions beyond these areas, particularly the ones in the upper posterior, can lift the buccal fat pad. But these already originate in the upper (temporal and pterygoid) internal compartments and are ideal for flaps to be used to close oroantral/palatal communications. Key steps include precise identification and mobilization of the fat pad, ensuring minimal disruption to surrounding tissues and neurovascular structures.
- If there is no facial asymmetry, the buccal fat pad tissue removed bilaterally should be excised evenly. Generally, the preferred method is to place the excised tissue in a syringe and measure its volume.
- After the fat is removed, the wound site is irrigated with 0.9% saline.
- The incision is then closed with absorbable sutures and patients usually have a rapid recovery with decreased swelling and discomfort within a few weeks (6,7).

Although a simple operation, bichectomy is not completely risk-free. Potential complications include hematoma, infection, salivary duct injury and nerve damage leading to facial asymmetry (8).

Furthermore, the irreversible nature of fat pad removal has raised concerns about long-term aesthetic consequences, such as hollowing of the cheeks and an aged appearance (9). For these reasons, when deciding on a bichectomy operation, it may be considered more ethical to have a functional benefit rather than relying solely on aesthetic reasons. Of course, patient expectations are also important. These factors should be carefully considered when evaluating the suitability of the procedure for oral surgeons.

4. Complications that may develop

- Soft tissue infections,
- Hematoma,
- Facial paralysis (especially buccal branch paralysis),
- Stenson canal injuries
- Chewing problems, swelling or oedema

Removal of the buccal fat pad has a very low morbidity and minimal complication rate, most complications are usually minor and transient, such as tenderness and swelling. As it is performed intraorally, it leaves no visible scar. (8)

No significant complications related to bichectomy have been reported. It is a procedure with high patient satisfaction rates. Of course, patient satisfaction can be further increased by preventing unrealistic expectations and proper patient communication.

5. But is bichectomy as an aesthetic procedure a preferable operation for surgeons to use routinely?

There are several clinical advantages that make bichectomy an attractive procedure. A high level of patient satisfaction can be achieved with minimal risk with both aesthetic and functional requirements. Clinical studies show that patients undergoing bichectomy by surgeons report a high level of satisfaction with their results (14). Improvements in facial contour, more prominent cheekbones and a more defined jawline are commonly cited outcomes. The success of the procedure depends on the surgeon's ability to manage patient expectations and deliver results that are both aesthetically pleasing and compatible with the patient's overall facial structure (15,16).

While bichectomy offers distinct advantages, there are also notable disadvantages and controversies associated with the procedure. One of the main controversies of concern is the irreversible nature of the removal of the buccal fat pad. Unlike other aesthetic procedures that can be adjusted or reversed, bichectomy permanently alters facial structure (10,11). This can have long-term consequences, especially as patients age. As facial fat naturally decreases over time, removal of the buccal fat pads can result in a thin or dimpled appearance, making patients appear older than their actual age (12).

Another controversy centers around the ethical considerations of performing a desired procedure based solely on aesthetic desires. Since facial structures change over time, it should be considered whether it is appropriate to perform a bichectomy operation on young patients who may later regret this decision. Pressure to conform to certain standards of beauty may also lead patients to seek procedures that may not be in their long-term best interests.

There are also risks of complications such as infection, hematoma, nerve damage and facial asymmetry (8). Although these risks are generally low when the procedure is performed by a skilled surgeon, they should still

be communicated to the patient as part of the informed consent process (13). The likelihood of adverse outcomes is considerably reduced with careful patient selection and comprehensive preoperative planning. The ethical implications of performing a cosmetic procedure that does not provide a functional benefit should be carefully weighed, especially in cases where patients may be seeking unrealistic or exaggerated facial changes.

Ethically and deontologically, the most ideal application area of the bichectomy operation is in cases where it is desired to perform this procedure functionally while providing aesthetic benefit.

6. Conclusion

Bichectomy is gaining attention as a facial contouring procedure that can significantly change the appearance of the midface by removing the buccal fat pad. The increasing demand raises the question of whether this operation should become a standard for surgeons.

Although the bichectomy operation is a potentially useful procedure for surgeons, caution should be exercised in making it a routine operation. The individual needs, anatomical features and long-term aesthetic expectations of each patient should be taken into account, ensuring that the procedure is performed in a clinically and ethically balanced manner. This approach helps to maintain the balance between the surgeon's expertise and the patient's satisfaction and ensures successful results in the long term.

The permanent and irreversible nature of bichectomy requires careful planning, especially against the negative changes that may occur in patients' faces as they age. Over time, the reduction of natural fatty tissue in the face, together with the removal of fat pads, can lead to an excessively sunken appearance of the face and make patients look older than they actually are. In this context, the individual anatomical structure, age and long-term aesthetic expectations of each patient should be carefully evaluated.

The ethical dimension of the operation should not be ignored. Surgeons need to adopt a more responsible approach to performing such procedures, which may have irreversible consequences in the long term in young patients who are driven solely by aesthetic desires. At this point, it is part of the ethical responsibilities of oral surgeons to ensure that patients have realistic expectations and to communicate clearly about the potential risks of the procedure.

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BÖLÜM 2

BRUKSİZM: TANI VE TEDAVİ YÖNTEMLERİ

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Giriş

Bruksizm, dişlerin sıkılması veya gıcırdatılmasına ek olarak alt çenenin öne veya yana itilmesiyle karakterize yaygın bir tıbbi problemdir. (Matusz et al., 2022) Bu durum parafonksiyonel bir aktivite olup maksiller ve mandibular dişlerin arasında kuvvetli bir temas ve yük aktarımına sebep olmaktadır. (Lobbezoo et al., 2018) Bruksizm genellikle istemsiz ve ritmik olarak gerçekleşir ve şiddetli çiğneme kası ağrıları, baş-boyun ağrıları, çene hareketlerinde kısıtlanma ve kas spazmlarıyla kendini göstermektedir. (Eren, Arıkan, Tamam, & Kasapoğlu, 2015) Genel anlamda bruksizm gece gerçekleştirilen parafonksiyonel bir aktivite olarak görülse de bruksizm görülen birçok bireyde bu aktivite gündüz de devam etmektedir. (BULUT & Saadet, 2012) Buna bağlı olarak bruksizm uyku ve gündüz bruksizmi olarak ikiye ayrılmıştır. Gündüz bruksizminde istem dışı çene kasılmasıyla birlikte diş sıkma alışkanlığı mevcuttur fakat bu tip bruksizmde gıcırdatma daha seyrek görülmektedir. Bu tip bruksizmin kişilik yapısı olarak gergin ve anksiyeteye yatkın bireylerde görüldüğü düşünülmektedir. (G. J. Lavigne, Kato, Kolta, & Sessle, 2003) Uyku bruksizminde diğer tip bruksizmden farklı olarak ritmik ve gıcırdatmanın da eklendiği bir tablo görülmektedir. (Yap & Chua, 2016)

Bruksizm çiğneme sistemi için oldukça zararlı bir aktivite olmakla birlikte bazı vakalarda hiçbir belirti vermezken bazı vakalarda hayatı tehdit edici bir rahatsızlık olmaksızın yaşattığı dental sorunlar ve orofasiyal ağrılar ile hastaların yaşam kalitesini etkilemektedir. (Grobet, Gilon, Bruwier, & Nizet, 2017; McNeill, 1997) Normal şartlarda stomatognatik sistemdeki kas-iskelet yapıları ve dental yapılar, vertikal ve lateral çiğneme kuvvetlerini karşılayacak güce sahip olmasına rağmen bruksizm gibi parafonksiyonel hareketlerde normal çiğneme kuvveti süresi dakikalardan saatlere kadar artmaktadır, kuvvetin yönü laterale doğru kaymaktadır ve bu şekilde normal çiğneme kuvvetlerinin yaklaşık 4 katı kadar kuvvet ortaya çıkmaktadır. (Lobbezoo et al., 2017) Sağlıklı bir çiğneme ve yutkunma fonksiyonunda alt çene dikey yönde hareket etmektedir ve karşıt arklar arasında diş temaları ve kuvvetler iyi olduğu kabul edilen dikey yöndedir fakat bruksizmde meydana gelen gıcırdatma ve kayma hareketinde her iki arttaki dişlere ağır lateral kuvvetler gelmektedir. (Okeson, 2003) Bu lateral kuvvetler diş ve çevre destekleyici yapılara zarar gelme ihtimalini arttırmaktadır. (Okeson, 2003) Buna ek olarak mandibulanın fonksiyonel hareketleri sıklıkla sentrik oklüzyon konumunda gerçekleşmektedir ve bu sayede fonksiyon sırasında oluşan kuvvetlerin oluşturabileceği olası hasar birden çok dişe dağıtılmaktadır. (Okeson, 2003) Bruksizm ise eksentrik oklüzyon konumunda gerçekleşmektedir, aktivite sırasında az sayıda dişte temas meydana gelmektedir ve bu şekilde yalnızca birkaç dişe ağır kuvvetler uygulanmaktadır. Bu pozisyon orofasiyal kas-iskelet sisteminde

daha çok gerilime sebep olmaktadır. (Reddy, Kumar, Sravanthi, Mohsin, & Anuhya, 2014)

Bruksizmin etiolojisinde dental, psikolojik ve sistemik birçok faktörün var olduğu düşünülmektedir fakat net bir etiolojik faktör belirtilememektedir. (Lobbezoo et al., 2017) Bundan dolayı birçok kaynak tarafından multifaktöriyel kabul edilmektedir. (Reddy et al., 2014) Literatürlerde sıkça bahsedilen diğer etiolojik faktörler arasında stres ve belirli kişilik yapısı gibi psikososyal faktörler, merkezi sinir sistemine ait faktörler ve bunlarla ilişkili nörotransmitterler, nörolojik bozukluklar, travma, kullanılan çeşitli ilaçlar ve uyku apnesi, horlama gibi uyku bozuklukları sayılmaktadır. (Magnusson & Helkimo, 2017) İkincil bruksizme sebep olabilecek faktörler arasında ise nörotransmitter sistem üzerine etkisi olan ilaç grupları ve antidepresan ilaç grupları gösterilmektedir. (Bostwick & Jaffee, 1999; Lobbezoo, Soucy, Hartman, Montplaisir, & Lavigne, 1997) Bunlara ek olarak literatürde bağımlılık yapıcı sigara, alkol, amfetamin gibi maddeleri kullanan bireylerde normal bireylere oranla temporomandibular eklem rahatsızlığı ve bruksizmin daha yaygın olduğu görülmektedir. (Winocur, Gavish, Voikovitch, Emodi-Perlman, & Eli, 2003) Kişilik özelliği de bruksizm etiolojisinde çok üzerinde durulan bir konudur ve stres düzeyi yüksek ve anksiyöz kişilerde görülme sıklığının arttığı düşünülmektedir. (Pierce, Chrisman, Bennett, & Close, 1995) Bruksizme sebep olabilecek birden çok faktör mevcut olduğu için bruksizmin azaltılmasında veya tamamen ortadan kaldırılmasında da tek bir tedavinin olmadığı anlaşılmaktadır. (Magnusson & Helkimo, 2017)

Bruksizmde tedavi yaklaşımına kadar vermeden önce durumu doğru teşhis etmek ve etiolojiyi belirlemek önemlidir. (Özgür, Arıfağaoğlu, & Karabekmez, 2019) İlk etapta bu durumun varlığını belirlemek ve şikayetleri anlamak için hastaya diş gıcırdatması veya sıkması yahut yakın çevresindeki insanların böyle bir durumu fark edip etmediği sorulmalıdır. (Thapliyal, 2006a) İncelemeye değer görülen durumlarda anamnez ve sorular derinleştirilmelidir. (Özgür et al., 2019) Anamnez derinleştirilirken hastaya “Sabahları uyandıığınızda çenenizde yorgunluk hissi oluyor mu?” , “Sabah uyandıığınızda diş ve diş kökü gibi yapılarda ağrı hissi oluyor mu?” , “ Sabah uyandıığınızda baş ve boyun bölgenizde ağrı oluyor mu?” gibi soruların sorulması faydalı olmaktadır. (Özgür et al., 2019) Bruksizm teşhisinde klinik bulguların varlığı önemli belirteçlerdir. (Özgür et al., 2019) Diş aşınması, bruksizm için belirgin bir bulgudur, bu aşınma normal çiğneme ile olmayan okluzal veya insizal kontakların incelenmesi şeklinde olmaktadır. (D. Manfredini, Winocur, Guarda-Nardini, Paesani, & Lobbezoo, 2013) (Klasser, Rei, & Lavigne, 2015) Periodontal açıdan sağlıklı ve iyi oral hijyene sahip hastalarda oluşan mobilite veya sabah erken saatlerde artıp günün ilerleyen saatleri içinde azalan mobilite artışı

bruksizmin bir belirtisi olarak kabul edilip hastanın anamnezine eklenmelidir. (Sateia, 2014) Hastaların klinisyenlere en sık başvurduğu belirtilerden olan orofasiyal ağrılar en belirleyici bruksizm semptomlarından birisidir. (Sateia, 2014) Bu ağrılar çiğneme kaslarında oluşan artmış tonus ve hipertrofi sebebiyle olmakla birlikte hastalar çiğneme kası palpasyonlarına karşı çok hassas olurlar. (Özgür et al., 2019) Bruksizm görülen hasta grubunun yarısından fazlasında temporal kas tonus artışına bağlı olarak şiddetli baş ağrısı şikayeti de vardır. (Sateia, 2014) Klinik bruksizm bulgularından en belirginlerinden bir diğeri ise dişlerin servikal bölgesinde stres yoğunlaşmasından dolayı meydana gelen diş maddesi kayıplarıdır, bu kayıplar klinisyenler tarafından abfraksiyon olarak adlandırılmaktadır. (D. Manfredini et al., 2013) Abfraksiyonlar çoğunlukla mandibular ve maksiller birinci premolar dişler ve bunları takiben ikinci premolar ve kanin dişlerinin bukkal yüzeyinde görülmektedir. (D. Manfredini et al., 2013) Normal çiğneme kuvvetlerine göre artmış ve ritmik kas fonksiyonunun etkileri sebebiyle hem restorasyonlarda hem de dişlerde çatlaklar ve fraktürler görülebilmektedir. (Thapliyal, 2006b) Protetik restorasyonlarda tekrarlayıcı desimantasyonlar görülmesi de bruksizm belirtileri arasındadır. (Thapliyal, 2006b) Diş sert dokularına ek olarak diğer dokularda da bruksizmin etkileri gözlenebilmektedir. (Özgür et al., 2019) Gece boyu diş sıkıma bağlı oluşan negatif basınç nedeniyle buksinatör kas hizasına denk gelen bukkal mukozada posterior dişlerin izi olarak gözlenen, beyaz, keratinize, patolojik olmayan bir çizgi oluşmaktadır ve linea alba olarak adlandırılmaktadır. (Coleman & Nelson, 1993; Langlais, Miller, & Gehrig, 2020; Scully, 2001) Ekzostos ve toruslar, bruksizme sahip hastalarda olmayanlara göre çok daha fazla gözlenmektedir. (Sateia, 2014) Bruksizm, temporomandibular eklem bölgesinde de hafif boyutlardan ciddi boyutlara kadar etkiler gösterebilmektedir. (Thapliyal, 2006b) Bruksizmle birlikte normalden fazla kuvvet kaslar ve ligamentler aracılığıyla eklem bölgesine iletilerek bölgede mikrotravmalara ve kanlanmada azalmaya sebep olmaktadır. (Jokubauskas, Baltrušaitytė, & Pileičikienė, 2018) Temporomandibular eklem diskinin internal düzensizliklerinin potansiyel nedenlerinden birisi bruksizm olarak sayılmaktadır çünkü sıkıştırıcı kuvvetler bu parafonksiyonel aktivitede oldukça etkilidir. (Milam, Zardeneta, & Schmitz, 1998) Tüm bunlara ek olarak gelen kuvvetler eklem bölgesinde diske tutunan diskal ligamentleri ve lateral pterygoid kası etkilemektedir ve disk konumunda değişikliklere sebep olabilmektedir. (Aksoy & Orhan, 2010) Oluşan internal düzensizlikler diskin yapısını değiştirir, bununla birlikte diskal ligamentler de uzar ve disk deplasmanları meydana gelir. (Aksoy & Orhan, 2010) Deplasman derecesi, ligamentlerdeki uzama miktarı ve disk morfolojisinde meydana gelen değişikliklere göre değişmektedir. (Aksoy & Orhan, 2010) Çene açılması sırasında meydana gelen deviasyon da disk

deplasmanlarına bağlı olarak meydana gelebilmektedir ve bruksizmin diğer belirtilerindedir. (Okeson, 2003)

Bruksizm Teşhisi

Günümüzde bruksizmin teşhis ve değerlendirmesinde farklı birçok yöntem bulunmaktadır; anket, klinisyen tarafından değerlendirilen klinik bulgular ve klinik incelemeler (diş aşınması, çiğneme kaslarında palpasyonda ağrı kontrolü vb.), ağız içi aparey kullanımı ve parafonksiyonel aktiviteye bağlı aşınma kontrolü, ısırma kuvvetinin ölçümü ve tespiti, çiğneme kaslarının elektromiyografik kaydı ve polisomnografi (uyku laboratuvarı kayıtları) bunlar arasında en yaygın kullanılanlardır. (Cortese & Biondi, 2009; de Leeuw, Klasser, & Pain, 2013; Madrid, Madrid, Vranesh, & Hicks, 1998; Okeson, 2003) Sayılan yöntemler arasında polisomnografinin altın standart olduğu konusunda konsensus sağlanmıştır. (de Leeuw et al., 2013) Polisomnografi yönteminde ses ve video kayıtlarıyla birlikte kas aktivitelerini görüntülemek için elektromiyografi (EMG) kullanılmaktadır. (Lobbezoo et al., 2018) Hasta uyku sürecindeyken masseter kası üzerine EMG uygulanmaktadır. (Lobbezoo et al., 2018) Bu kayıtlarda diş gıcırdatma sesi ile birlikte fazik kas kasılmaları ya da tonik kas kasılması olarak izlenen ritmik masseter kas aktivitesi varlığı bruksizm için kesin tanı koydurucudur. (Şenel, Dede, & Karadeniz, 2015) Fakat bu yöntem yüksek maliyet, hastanın birkaç gece boyunca hastane ortamında gözlem altında kalması gerekliliği, ses ve video kayıtları için gereken özel ekipmanlar, bu konuda deneyimli uzman hekim gereksinimi ve hasta uyumunun zorluğu gibi sebeplerle rutin olarak kullanılamamaktadır. (Yavuz & Bayazıt)

Tedavi

Bruksizm tedavisi, etiyojisine göre ve hastadan hastaya farklılık göstermektedir. (Özgür et al., 2019) Bruksizm ve bruksizme bağlı oluşan temporomandibular eklem rahatsızlıklarının tedavisinde koruma yöntemlerinden, cerrahi operasyonlara kadar birçok yöntem vardır. (de Leeuw et al., 2013) Oklüzal apareyler (splint), oklüzyonun düzenlenmesi, psikolojik tedaviler, fizik tedavi ve ilaç kullanımı en sık kullanılan yöntemlerdendir. (BULUT & Saadet, 2012)

1. Hasta Farkındalığının Artırılması ve Bilgilendirme

Klinisyen tarafından yapılan gerekli muayeneler ve değerlendirmelerden sonra bruksizm teşhisi konulan hastalara, bruksizmin bir parafonksiyonel alışkanlık olduğu anlatılmalı ve hasta bilgilendirilmelidir. (de Leeuw et al., 2013) Hasta bu yönlendirmelerle gün içinde belli bir miktara kadar

bu aktiviteyi kontrol edebilmektedir ve farkındalığı artmaktadır. (Johansson, Omar, & Carlsson, 2011; Özgür et al., 2019)

2. Fizik Tedavi

Medikal tedaviler ve invaziv girişimlerden önce girişimsel olmayan fizik tedavi gibi yöntemlerin uygulanması önemlidir. (Yazici et al., 2023) Fizik tedavide transkutanöz elektriksel sinir uyarımı (TENS), terapötik ve kas gevşetme egzersizleri, postür farkındalığı, akupunktur, Kinesio bantlama, ve manuel terapi gibi yöntemler bulunmaktadır. (Amorim, Santo, Sommer, & Marques, 2018) Bu uygulamalar kas hiperaktivitesini, ağrıyı, sertliği azaltmayı amaçlarken dolaşımı arttırmayı hedeflemektedir. (Daniele Manfredini, Serra-Negra, Carboncini, & Lobbezoo, 2017) (Okeson, 2003)

3. Farmakolojik Tedavi

Genel olarak direkt uyku ya da uyanıklık bruksizmi üzerine etkili bir farmakolojik tedavi mevcut değildir. (BULUT & Saadet, 2012) Diğer sistemler üzerine etkili bir takım ilaçlar mevcuttur fakat bu tarz farmakolojik tedavilerin sadece kısa dönem kullanımı önerilmektedir. (BULUT & Saadet, 2012) Bu ilaçlar genel manada benzodiazepinler, santral kas gevşeticiler, trisiklik antidepresan grubu ilaçlardır ve sık kullanılan ilaç grubundandır. (Wahlund, List, & Larsson, 2003) Santral sinir sistemine etki eden benzodiazepin grubu ve kas gevşetici ilaçlar bruksizm kaynaklı kas hiperaktivitesini azaltmaktadır fakat gün içinde uzayan etkisi sebebiyle uykuya neden olduklarından dolayı uzun dönem kullanılamamaktadır ve etkinliği tam ölçülememektedir. (BULUT & Saadet, 2012) Bruksizm tedavisinde kullanılan bir diğer ilaç grubu trisiklik antidepresanlardır. (Saletu et al., 2005) Bruksizimli hastalar üzerinde tedavi edici etkilerini uykunun REM evresini kısaltması ve NREM evresini uzatması şeklinde göstermektedirler. (Mohamed, Christensen, & Penchas, 1997) Antidepresan grubu olmasına rağmen merkezi sinir sisteminde serotonin aktarımı artışı nedeniyle Serotonin Geri Alım İnhibitörleri (SSRİ) grubu ilaçların var olan bruksizm tablosunu ağırlaştırdığı düşünülmektedir. (G. L. Lavigne, Lobbezoo, Rompré, Nielsen, & Montplaisir, 1997) Dopamin agonistleri ve botulinum toxin A gibi daha nadir kullanılan ajanlar da mevcuttur. (Wahlund et al., 2003)

4. Psikiyatrik Destek Tedavisi

Kişilik özellikleri bruksizmde önemli bir etiyolojidir. (de Leeuw et al., 2013) Stresli ve anksiyöz kişiler bruksizme daha yatkın olmaktadır. (de Leeuw et al., 2013) Psikodavranışsal yöntemler, gevşeme, psikoterapi ve

hipnoz gibi yöntemler kullanılabilir yöntemler arasındadır. (Olkinuora, 1972) Psikoterapi yöntemi bilişsel davranışçı terapi, biofeedback (biyolojik geri bildirim) ve gevşeme egzersizlerini içeren bir bütündür. (Fjellström, Yakob, & Söder, 2010) Bu tedavi yönteminin en önemli unsuru hastanın mevcut davranış örgüsünü ve düşünce yapısını değiştirmeye yetli ve farkında olmasıdır. (Fjellström et al., 2010) Ek bir yöntem olarak, hastada solunum farkındalığı oluşturmak ve hastanın solunumunu burun solunumuna kaydırmak faydalı olmaktadır. (J.D, Tran, Camoin, & Mantout, 2013)

5. Oklüzal Splint Tedavisi

Oklüzal splintler; temporomandibular eklemi stabilize etmek, artmış kas aktivilerini azaltmak, dişleri aşınma kuvvetlerinden ve travmadan korumak için uygulanan akrilikten üretilen apareylerdir. (De Boever, Van Den Bergh, De Boever, & Keersmaekers, 1999) Kullanımları sayesinde kondilleri fizyolojik pozisyona getirmek, eklem gelen aşırı yükleri hafifletmek, spazma uğramış kas gruplarını gevşetmek hedeflenmektedir. (Okeson, 2003) Splintler tedavi etkilerini; kondili ve çevresindeki yapıları en stabil haline getirerek, dikey boyutu artırarak, hastanın brüksizmle alakalı farkındalığını artırarak gösterebilmektedir. (Johansson et al., 2011; McNeill, 1997)

Oklüzal splint çeşitleri;

- Sentrik İlişki Splinti (Stabilizasyon Splinti, Relaksasyon Splinti veya Kas Gevşetici Splint)
- Ön Konumlandırma Splint (Anterior Repozisyon Splinti)
- Ön Isırma Plağı
- Arka Isırma Plağı
- Yumuşak Splintler

Sentrik İlişki Splinti

Sentrik ilişki splintleri dikey boyutu arttırmazlar fakat maksillomandibular ilişkiyi değiştirmezler. (Okeson, 2003) Bu apareyler sayesinde eklem kompleksinde stabilite oluşur, kaslar gevşer ve mandibula yeni konumuna adapte olur. (Al-Saad & Akeel, 2001; Lin, Wang, & Chang, 2008) Stabilizasyon splintleri en sık kullanılan ve yüksek oranda başarıya sahip splint türleridir, kas kaynaklı problemlerde etkinlikleri daha fazla olmaktadır ve kas hiperaktivitesini azaltmakta oldukça etkilidirler. (Al-Saad & Akeel, 2001; Odabaş & Arslan, 2008) Bu tip splintler, brüksizm kaynaklı tempo-

romandibular disfonksiyon (TMD) vakalarında, kas spazmının eşlik ettiği klik sesi durumlarında da faydalı olmaktadır. (Yap, 1998)

Ön Konumlandırma Splinti

Bu splintle alt çenenin interküspal pozisyonundan daha öne ve aşağıya yönlendirilmesi hedeflenmektedir. (McNeill, 1997) Splintin kullanımı neticesinde mandibula pozisyonu kalıcı olarak değişmez, sadece retrodiskal dokuların adaptasyonu sağlanmaya çalışılır. (Aynali & Yener, 2013; Okeson, 2003; Yaltirik, 2017) Klinisyen tarafından istenilen konum, hasta ağzını açıp kapatırken klik sesinin olmadığı pozisyonudur ve bu şekilde iyileşme sağlanır çünkü retrodiskal dokuların rahatlamasıyla kanlanma artar. (Kreiner, Betancor, & Clark, 2001; McNeill, 1997)

Ön ısırma Plağı

Ön ısırma plağı, maksiller arkı kaplayan ve sadece mandibular ön dişlerle temas gerçekleştiren bir apareydir, bu şekilde posterior diş teması kesilerek hiperaktif kas grubu rahatlatılmaya çalışılmaktadır. (Laskin DM, 2006)

Arka ısırma Plağı

Mandibular arka uygulanan, sert bir aparey olan arka ısırma plağı, dikey boyutu düzeltir ve mandibula pozisyonunu değiştirir. (Al-Saad & Akeel, 2001; Okeson, 2003) Özellikle bruksizmin eşlik ettiği ve etmediği disk deplasmanlarının varlığında kullanılmaktadır. (Al-Saad & Akeel, 2001; Okeson, 2003)

Yumuşak Splintler

Termoplastik malzemedan yapılan, uyumlama ihtiyacı olmayan ve karşıt dişlerle devamlı temas sağlayan apareylerdir. (Özgür et al., 2019) Klinisyenler tarafından oldukça sık uygulanan bu splintler uyumlanmadıkları takdirde semptomlarda artışa sebep olabilmekle birlikte yumuşak yapısının çiğneme alışkanlığını pekiştirdiği yönünde görüşler mevcuttur. (Egermark, Carlsson, & Magnusson, 2001)

Bruksizmin tedavisinde alternatif yöntemlerden bir tanesi de Clostridium Botulinum bakterisinden elde edilen bir ekzotoksin olan botulinum toksininin çiğneme kaslarına enjeksiyonudur. (Özgür et al., 2019) Bu toksin kolinerjik motor son plaklardaki asetilkolin salınımını inhibe eder ve uygulandığı bölgedeki kas ve bez yapılarında aktivasyon azalmasına sebep olur. (Gu et al., 2015) Botoks enjeksiyonları, sıklıkla ana çiğneme kasları

olan masseter ve temporal kaslarını rahatlatmak için uygulanır. (Borodic, Acquadro, & Johnson, 2001) Uygulamanın etkileri enjeksiyon sonrası üçüncü günden sonra görülmeye başlamaktadır, maksimum etki ikinci haftadadır. (Borodic et al., 2001) Botoks uygulaması sonrası 3 ila 6. ayların sonunda tekrar akson terminallerinin oluşmasıyla etkilerinde gerileme görülmeye başlar, bu durumdan dolayı hastalara uygulamanın etkisinin geçici olduğu ve tekrarlanması gerektiği anlatılmalıdır. (Arinci, Güven, Yazar, Başaran, & Keklik, 2009) (Guarda-Nardini et al., 2008)

Sonuç

Gündüz veya gece gerçekleşen bruksizm aktivitesinde; morfolojik, santral ve lokalize bir çok etiyoloji mevcuttur; buna bağlı olarak tedavi etiyolojiye göre belirlenmelidir. (BULUT & Saadet, 2012) Teşhis için en güvenli yöntem olarak polisomnografi bildirilmiştir. (Cortese & Biondi, 2009; Madrid et al., 1998; Pierce et al., 1995) Bruksizm tedavisinde en sık kullanılan yöntem oklüzal splintlerdir, oklüzal splintlerle birlikte botulinum toksini uygulanması iyi dönüşlere sebep olsa da botulinum toksininin geçici bir çözüm olduğu unutulmamalıdır. (BULUT & Saadet, 2012)

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BÖLÜM 3

NON-ODONTOGENIC CYSTS

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INTRODUCTION

A cyst is defined as a pathological cavity with fluid, semi-fluid, or gaseous contents that is not created by the accumulation of pus (Kramer, 1974). The pathologic cavity must have an epithelial lining to classify as a cyst (Shear & Speight, 2007). Various types of cysts can occur on jaw bones. These cysts are classified based on their origin of epithelial lining. Odontogenic cysts originated from remnants of tooth-producing tissue, while non-odontogenic cysts originated from tissue other than tooth-producing tissue remnants (Givony, 2020).

Maxilla and mandible show a predilection for odontogenic cysts, whereas non-odontogenic cysts are uncommon (Philbert & Sandhu, 2020). Even though non-odontogenic cysts are rarely seen on jaw bones, their classification is significant for making a differential diagnosis from other jaw cysts and planning the proper treatment. Numerous classifications have been published for non-odontogenic cysts since these entities were identified.

This chapter provides an overview of the classification of non-odontogenic cysts according to the World Health Organization (WHO) from the past to the present. It also includes brief information about etiology, epidemiology, histopathology, clinical presentation, radiographic findings, current imaging methods, treatment options, and differential diagnosis of non-odontogenic cysts supported by recent studies. Moreover, in this chapter, classifications made by WHO so far are discussed chronologically (Table 1).

WHO CLASSIFICATION(S) OF NON-ODONTOGENIC CYSTS

The First Edition (1971) of the WHO Classification

Jaw cysts were classified as epithelial cysts. The epithelial cysts were further divided into two types: developmental and inflammatory cysts. The developmental cysts were then subdivided into odontogenic and non-odontogenic cysts. The non-odontogenic cysts included the nasopalatine duct cyst (incisive canal cyst), globulomaxillary cyst, and nasolabial cyst (nasoalveolar cyst) (Kramer, Pindborg, & Shear, 1992).

The Second Edition (1992) of the WHO Classification

Non-odontogenic cysts were categorized same as the previous one, with the exception of the globulomaxillary cyst, which was then removed from the non-odontogenic cysts section. A commentary article on the

second edition mentioned that the concept of side-to-side fusion of the embryonic facial processes has been discarded, except for the palatal processes that join in this way. Fissural cysts, which supposedly arise from epithelium trapped in the lines of fusion, could be placed into different sections. Therefore, lesions that were formerly considered “fissural” cysts are mentioned in the text of the second edition but were not included in the classification. As a result, solely nasopalatine duct cyst and nasolabial cyst were included in the second classification in 1992 (Kramer, Pindborg, & Shear, 1992). Moreover, a further study stated that the globulomaxillary cyst name was no longer valid because the entrapment of epithelium theory is no longer accepted. Instead, globulomaxillary cysts have been recognized as radicular or lateral periodontal cysts or keratocystic odontogenic tumors (White, 2009).

The third edition (2005) of the WHO classification

There were no changes made to the classification of non-odontogenic cysts; the 1992 classification remained relevant until 2017. (Soluk-Tekkesin & Wright, 2018).

The Fourth Edition (2017) of the WHO Classification

The nasolabial cyst was removed from the category of non-odontogenic cysts, and the only type of non-odontogenic cyst is the nasopalatine duct cyst (Barrios-Garay, Agudelo-Sánchez, Aguirre-Urizar, & Gay-Escoda, 2021). It is possible that the nasolabial cyst may have been removed for the same reason as the globulomaxillary cyst, which was also formerly considered as a fissural cyst (Kramer, 1974). Furthermore, various classifications acknowledge the nasolabial cyst as a non-odontogenic cyst (Shear & Speight, 2007) (Regezi, Sciubba, & Jordan, 2017).

The Fifth Edition (2022) of the WHO Classification

Divisions of developmental (odontogenic/non-odontogenic) and inflammatory have been removed. Thus, the jaw cysts are no longer subdivided in this edition, and the ‘cysts of the jaw’ term includes them all. Excluding the odontogenic cysts, there are two entities. One of them is the nasopalatine duct cyst, and the other one is surgical ciliated cyst which is not a new entity but new for the classification. A commentary article on the fifth edition suggested that these two entities be grouped under the umbrella term of ‘Other Cysts of Jaws’, which may be reasonable since there is no specific category for non-odontogenic cysts in the fifth edition (Soluk-Tekkesin & Wright, 2022).

Table 1*Classification of non-odontogenic cysts given by WHO according to year.*

WHO Classification	Non-odontogenic Cysts
1971 (1st edition)	<ul style="list-style-type: none"> • Nasopalatine duct cyst (incisive canal cyst) • Globulomaxillary cyst • Nasolabial cyst (nasopalveolar cyst)
1992 (2nd edition)	<ul style="list-style-type: none"> • Nasopalatine duct cyst • Nasolabial cyst
2005 (3rd edition)	<ul style="list-style-type: none"> • Nasopalatine duct cyst • Nasolabial cyst
2017 (4th edition)	<ul style="list-style-type: none"> • Nasopalatine duct cyst
2022 (5th edition)	<ul style="list-style-type: none"> • <i>Nasopalatine duct cyst</i> • <i>Surgical ciliated cyst</i>

Note. In the fifth edition, the most recent classification by WHO, subdivisions of developmental (odontogenic/non-odontogenic) and inflammatory have been removed. Thus, the jaw cysts are no longer categorized in this edition, and the ‘cysts of the jaw’ term include them all. Excluding the odontogenic cysts, there are two entities. One of them is the nasopalatine duct cyst, and the other one is surgical ciliated cyst which is not a new entity but new for the classification. (Soluk-tekketin & Wright, 2022). In this table those two cysts grouped under the term “Non-odontogenic Cysts” and further information is given below.

NASOPALATINE DUCT CYST

Nasopalatine duct cyst is the most common non-odontogenic cyst of the jaw (Anneroth, Hall, & Stuge, 1986). The frequency of the cyst has been reported to range from 1% to 11.6% of all jaw cysts. The male-to-female ratio is regarded as 3:1, and it is most prevalent among middle-aged individuals. (Kagoya, Iwanami, Mochizuki, Kondo, & Ito, 2022).

Although the etiopathogenesis of nasopalatine duct cysts is uncertain, there are several hypotheses. Embryonic tissue remnants may proliferate spontaneously or infection, trauma or mucus retention may stimulate epithelial remnants of the nasopalatine duct cyst (Vasconcelos, de Aguiar, Castro, de Araújo, & Mesquita, 1999).

Histopathologically, the most prevalent type of epithelial lining is the stratified squamous epithelium, which corresponds to nearly 75% of all nasopalatine duct cysts. The second most prevalent type is the pseudost-

ratified columnar epithelium. Although they are relatively uncommon in comparison to the other varieties, columnar and cuboidal epithelium can also be identified. Nevertheless, depending on the cyst's location, multiple epithelial types are typically diagnosed (Lee, Hwang, Jin, & Chiang, 2024).

In addition there is only one case report about nasopalatine duct cyst epithelium which indicates sebaceous differentiation. The aforementioned case report documented three major possibilities as follows: The first hypothesis suggested that epithelial cells differentiate from sebaceous cells because of unknown traumas or chronic periodontitis. The second hypothesis proposed that nasopalatine duct cysts initially occur, and with cysts' hydrostatic pressure, adjacent epithelial cells indicate sebaceous differentiation. The last hypothesis posited that nasopalatine duct cysts occur first, followed by sebaceous metaplasia of the cyst's epithelial lining. This before-mentioned case report considered the third hypothesis more likely because columnar cells are differentiated into stratified squamous cells where the epithelium is adjacent to the sebaceous component, as a metaplastic change (Yeom, Kang, Yun, & Yoon, 2021).

Clinical presentation of nasopalatine duct cyst may be asymptomatic swellings of the palate (Popli, Singh, Gupta, & Kamboj, 2021). Additionally, the cyst may also be diagnosed on routine radiographic examination without any clinical signs or symptoms. Symptoms usually occur when the cyst is infected and presents a swelling with or without pain. As well as a potential fistula to the oral or nasal cavity (Al-Haj Husain et al., 2023).

Cysts that are localized superficially are commonly identified by the bluish color of a fluctuant swelling, in contrast to the deeper cysts. Moreover, cysts affecting the nasopalatine nerve can lead to numbness and tingling sensations (Escoda Francolí, Almendros-Marqués, Berini Aytés, & Gay Escoda, 2008) (Shylaja, Balaji & Krishna, 2013). Different types of discharges may occur. In the case of mucoid discharge, the patient may notice a salty taste, while a purulent discharge may cause a foul taste (Hasan et al., 2022). In general, the maxillary anterior teeth are vital and are not displaced by the lesion (Al-Haj Husain et al., 2023).

Radiologic examination of nasopalatine duct cyst includes, occlusal radiography, panoramic radiography (Figure 1), CT, CBCT (Figure2-3) or MRI. Occlusal radiography shows a round-to-ovoid or heart-shaped radiolucency between the roots of the maxillary central incisors. Furthermore, the characteristic heart shape appearance results from the superimposition of the anterior nasal spine or septum (Suter, Sendi, Reichart, & Bornstein, 2011).

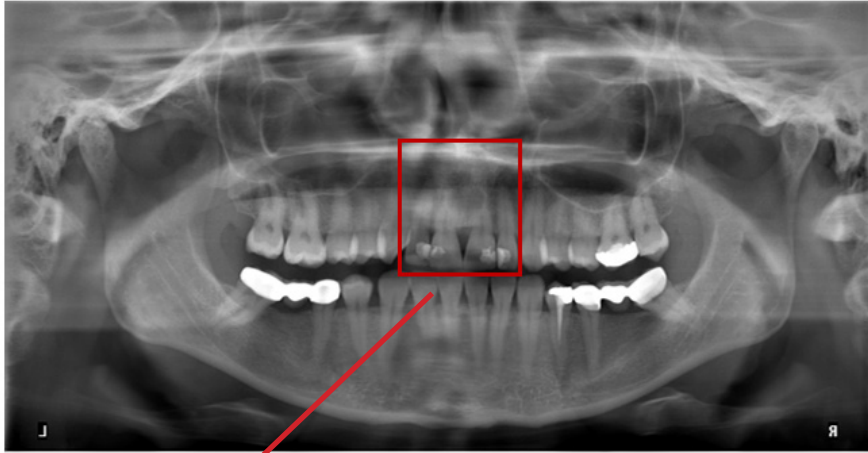


Figure 1. Panoramic radiograph shows a nasopalatine duct cyst.

CBCT or CT usually indicates the localization and extension of lesions, as well as any potential displacement, or infiltration of adjacent tissues. CBCT is widely recognized as the gold standard for imaging osseous tissue in the dentomaxillofacial region, even though it has limitations in soft-tissue contrast (Kiljunen, Kaasalainen, Suomalainen, & Kortensniemi, 2015).

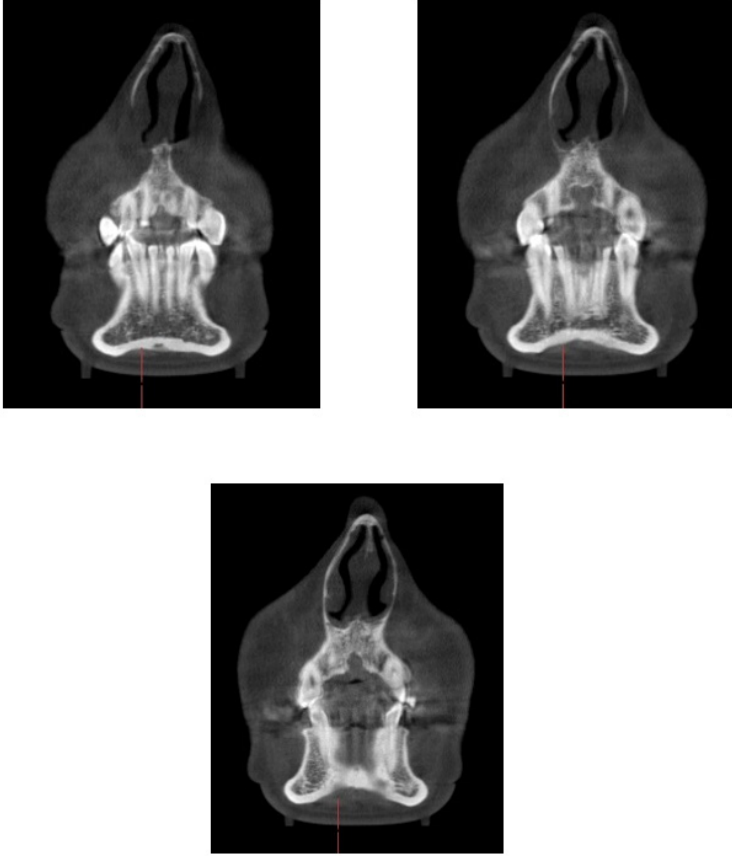


Figure 2. Coronal CBCT images show a nasopalatine duct cyst.

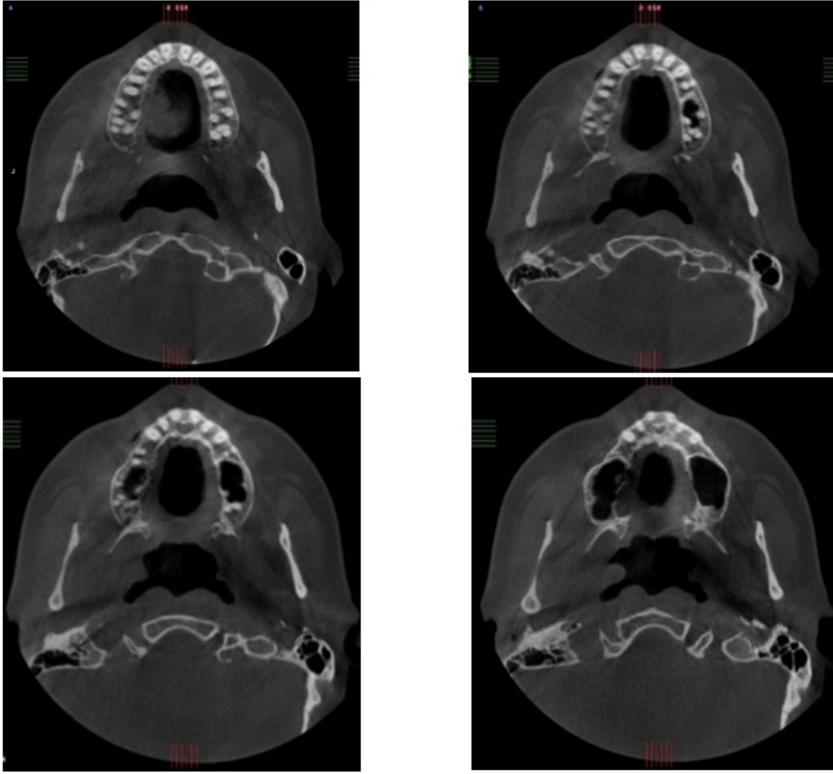


Figure 3. Axial CBCT images show a heart-shaped nasopalatine duct cyst.

MRI is also a choice for imaging nasopalatine duct cysts. It is either a radiation-free technique or provides the advantage of imaging soft tissue pathologies. Nevertheless, more data are required to diagnose nasopalatine duct cysts with MRI as a consequence of the inadequate number of cases (Al-Haj Husain et al., 2023).

A recent case report has identified a novel radiographic sign about the nasopalatine duct cyst. Cross-sectional imaging in the form of CT and/or MRI reveals a ‘Mickey Mouse’ sign, a bi-lobed appearance of nasopalatine duct cyst in coronal view. This novel sign can help differentiate the nasopalatine duct cyst from similar pathologies, such as granulomas, radicular cysts of central incisors, and nasolabial cysts that generally appear bilaterally on either side of the midline (Gowrishankar, Haloob, & Hopkins, 2023).

The most common treatment for nasopalatine duct cysts is complete enucleation through sublabial or palatine approached open surgery. Marsupialization is an option for the treatment of larger cysts. However, some complications have been reported with these approaches, such as

paresthesia of the palate due to damage to the sphenopalatine nerve and the formation of persistent oronasal fistulas, along with patient discomfort. (Elliott, Franzese, & Pitman, 2004). Recently, a case report introduced a new approach for treating nasopalatine duct cysts, known as endoscopic transnasal marsupialization. This technique is less invasive, shorter, and has less morbid recovery. However, temporary paresthesia around the upper incisors has been reported due to damage to the nasopalatine nerve (Gowrishankar, Haloob, & Hopkins, 2023).

Differential diagnosis includes other cystic odontogenic lesions, particularly radicular cyst and odontogenic keratocyst. During a dental examination, a radicular cyst is usually ruled out through radiographic examination and vitality testing of adjacent teeth, while an odontogenic keratocyst is excluded through histological examination (McLean & Vargas, 2023).

NASOLABIAL CYST

Although the fourth and fifth editions of the classification excluded the nasolabial cyst, it is mentioned in this chapter due to its clinical importance. The nasolabial cyst is comparatively uncommon non-odontogenic cyst. The discovery of nasolabial cyst was initially documented by Emil Zuckerkandl in 1882. (Liu et al., 2023). The literature contains 20 synonyms of nasolabial cysts. Nevertheless, nasolabial cyst, nasoalveolar cyst, and Klesdat's cyst are synonyms that are widely accepted (Allard, 1982).

The nasolabial cyst affects approximately 1.6 out of 100,000 individuals annually. The male-female ratio is 1.0:3.6 in terms of demographics. The nasolabial cyst is typically diagnosed in individuals between fourth to fifth decades. These cysts tend to be unilateral, however there are also bilateral cysts with a 10% prevalence (Anekar, Kumar, Chirakara, & Bai-padavu, 2018).

The etiology of nasolabial cysts remain unknown. Previously, clinicians believed the nasolabial cyst was a retention cyst. There are many hypotheses for explaining the origin of nasolabial cyst (Ahmed, Hussein, Amin, & Khalefa, 2023). Klestadt initially proposed that the origin of the condition can be traced back to embryonic development, namely from the remnants of epithelial tissue in the midnasal, globular, and maxillary processes (known as fissural cyst). Unfortunately, there was no evidence that supported this claim, so many researchers rejected this hypothesis. The lesion was thought to be connected to the lower anterior part of the nasolacrimal duct (developmental cyst) in a theory that was more widely accepted and was proposed by Bruggemann (Bruggeman, 1920). Both the nasolabial cyst and the nasolacrimal duct contain a pseudostratified epithelial lining that is comparable to one another. In addition, the fact that it is located

anteriorly to the entry of the nasolacrimal duct into the inferior meatus provides evidence that supports before-mentioned theory (Klestadt, 1953).

Moreover, in order to provide support for this theory, a rare syndrome that includes oxycephaly, nasal deformity, and bilateral nasolabial cysts along with bilateral aplasia of the nasolacrimal ducts are all symptoms that are associated with a unique syndrome that has been observed in a sibling (Mindikoglu, Erginel, & Cenani, 1991). Another concept proposes that the development of nasolabial cysts is caused by the increased growth of residual epithelial cells in the affected area, which is triggered by trauma, chronic inflammation, and scarring (Aikawa et al., 2008).

The histopathological examination shows that the lining of the cyst corresponds to a ciliated pseudostratified columnar epithelium and, less frequently, a stratified squamous epithelium. Goblet cells are commonly scattered throughout the cyst lining. Additionally, apocrine changes or focal squamous metaplasia can be observed. Furthermore, the histologic characteristics of nasolabial cysts are similar to the epithelium of the lacrimal drainage system. Apocrine changes or focal squamous metaplasia may also be observed. In addition, histologic features of nasolabial cysts are similar to the lacrimal drainage system's epithelium (Tilaveridis, Venetis, Tatsis, Kalaitidou, & Zouloumis, 2023).

Clinically presents a swelling without pain in the nasolabial area, resulting in extraoral asymmetry and possible intraoral expansion. The prognosis of the lesion is a gradually growing mass that can lead to ipsilateral nasal obstruction. The relevant area is characterized by a soft, fluctuating texture and painless in palpation unless there is an accompanying secondary infection. A nasolabial cyst can be identified by the presence of a fluctuating swelling with a cystic consistency in the well-located nasolabial sulcus (Tilaveridis, Venetis, Tatsis, Kalaitidou, & Zouloumis, 2023).

Radiographically, CT and MRI are both helpful in making a diagnosis. CT has a relatively high contrast resolution, and it provides a superior degree of hard tissue detail and soft tissue delineation (Amaral et al., 2005). In addition, CT is preferred over MRI for the assessment of a suspected nasolabial cyst due to its reduced cost (Curé, Osguthorpe, & Van Tassel, 1996). Alternatively, MRI is capable of producing direct axial, sagittal, and coronal cross-sections, all of which have an exceptional resolution across soft tissues (White, & Pharoah, 2009).

The use of USG, on the other hand, can result in more accurate imaging than CT and MRI. The USG, MRI, and CT were all compared in a recent study. Based on the findings of the study, it was determined that USG exhibited superior sensitivity and accuracy, in addition to a reduced risk of missed diagnosis compared to CT and MRI. As a result, it is important to

take into consideration the extensive utilization of USG for the determination of nasolabial cysts (Liu et al., 2023).

Complete surgical excision is suggested as a treatment method with low recurrence rates. The surgical excision procedure enhances cosmetic appearance, confirms a histopathological diagnosis, and protects against cyst infection (Özer, Cabbarzade, & Ögretmenoglu, 2013). There are seven management modalities include: A transoral-sublabial technique, endoscopic transnasal marsupialization, a modified lateral rhinotomy technique, incision and drainage, simple aspiration and cauterization, and injection of sclerotic agents. Rarely, recurrence and malignant transformation may be observed following surgery. All the other modalities, except endoscopic marsupialization and sublabial complete surgical excision, have a higher recurrence rate. A recent study claimed that transnasal endoscopic marsupialization can reduce cost, shorten surgery time, and minimize postoperative pain. It may also result in fewer complications without recurrences (Ahmed, Hussein, Amin, & Khalefa, 2023).

The differential diagnosis for nasolabial cysts are radicular cysts, periapical abscesses, nasopalatine duct cysts, benign mesenchymal tumors, and minor salivary gland tumors. (McKinney & Olmo, 2023).

SURGICAL CILIATED CYST

The surgical ciliated cyst is recently classified in ‘WHO 2022 classification of jaw cysts’. However, it is not a new entity. The surgical ciliated cyst was first described by Kubo in 1927 in the Japanese literature as a maxillary cyst after treatment of chronic maxillary sinusitis (Kubo, 1927). Synonyms of this cyst are postoperative maxillary cyst, paranasal cyst, or respiratory implantation cyst (Soluk-tekkesin & Wright, 2022).

The most common age range is the 5th to 6th decades, and there is no gender predilection. The common location of this cyst is the posterior maxilla, but very rarely in the mandible due to implantation of sinus epithelium by contaminated instruments or using nasal bone or cartilage with epithelium for augmentation genioplasty (Kahn et al., 2021).

Etiologically, a theory is supported that the sinus membrane becomes entrapped due to the closure of wounds as a result of surgical procedures. This may start the inflammatory process, which could stimulate epithelial proliferation and result in the expansion of the cyst, potentially due to osmotic pressure (Siwach, Joy, Gaikwad, & Meshram, 2020).

Histopathologically, the cyst is lined by ciliated pseudostratified columnar epithelium, and mucous cells are common. A history of previous

surgery is an essential criterion for diagnosis (Soluk-Tekkesin & Wright, 2022).

The main clinical signs of surgical ciliated cyst are progressive maxillary swelling, facial asymmetry, severe pain, and nasal or oral discharge (CorderoGarcia, LozanoRosado, FontillonAlberdi, GutierrezPerez, & Infantecossio, 2023).

Radiographic examination reveals a well-defined, expansive, unilocular, or multilocular radiolucent image close to the sinus and the previous traumatic or surgical area (Soluk-tekkesin & Wright, 2022). Initially, panoramic and Waters radiographs were the primary imaging modalities utilized. Nevertheless, it is advisable to utilize CT imaging in order to conduct a thorough evaluation of the lesion and determine the most suitable course of treatment (CorderoGarcia, LozanoRosado, FontillonAlberdi, Gutierrez-Perez, & Infantecossio, 2023).

Treatment options include the Caldwell–Luc operation, which involves completely removing the cyst lining along with nasal antrostomy, as recommended by previous studies. However, a recent study was the first to report marsupialization via Le Fort I osteotomy of a surgical ciliated cyst in the deep infratemporal fossa. The study mentioned above claimed that the risk of morbidity can be reduced by less invasive surgery (Kwack, Yoon, Park, Lee, & Kim, 2023).

The differential diagnosis typically encompasses a range of lesions, such as odontogenic or nonodontogenic developmental cysts, fibro-osseous lesions, traumatic bone cysts, aneurysmal bone cysts, odontogenic tumors, mucocèles, retention cysts, and pseudocysts of the maxillary sinus (Theofilou, Lombardi, & Scolozzi, 2021).

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